



CLASS 1
NSF/ANSI 40

OPERATION, MAINTENANCE & TROUBLE SHOOTING MANUAL

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1.0 GENERAL DESCRIPTION OF SYSTEM

The Puraflo® Peat Biofilter is an advanced secondary treatment system that purifies septic tank effluent to an extremely high degree before final disposal.

A typical Puraflo® Peat Biofilter system consists of:

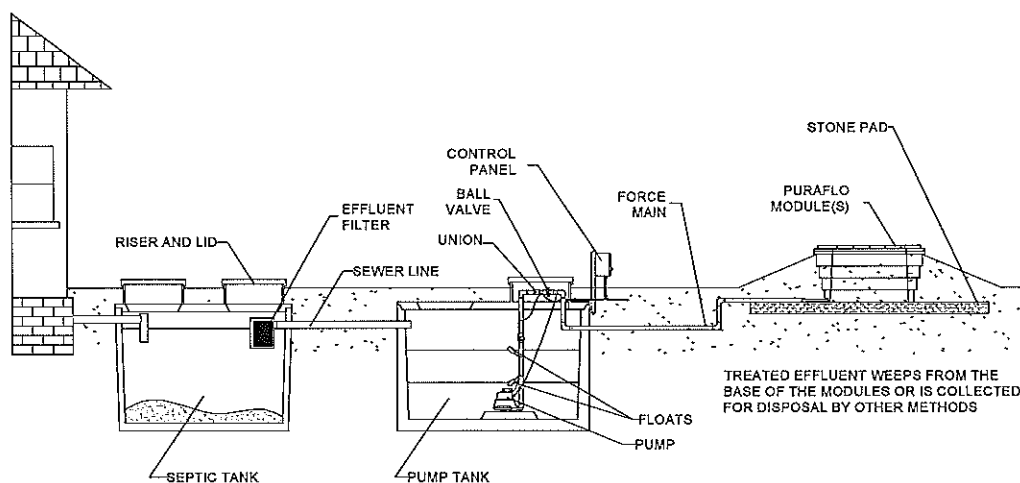
1. A septic tank fitted with an effluent filter on the outlet pipe.
2. A dosing tank and effluent pump or siphon to accommodate dosing of the septic tank effluent onto the peat fibre media.
3. Biofilter modules where advanced treatment occurs due to the physical, chemical and microbial processes that are optimized in the peat fibre media.
4. The site specific final effluent disposal system.

The filtered septic tank effluent is collected under gravity in the pump / siphon tank. A time dosing system is activated by a programmable timer, which pumps the effluent through a flow splitting inlet manifold located at the base of the treatment modules. An orifice plate is located inside the top of each inlet manifold which allows the flows to be split equally and fed simultaneously to each biofilter module. The inlet manifold is connected to the base of the biofilter and is fed upwards to a rectangular distribution grid located 6 inches below the top of each module. The effluent percolates laterally and vertically through the depth of the peat fibre treatment media and emerges as a clear innocuous liquid from the base of the system, for collection or dispersal.

The Puraflo® Peat Biofilter System for wastewater treatment has been tested, certified and listed by NSF International as meeting the requirements of ANSI / NSF Standard 40, Class 1.

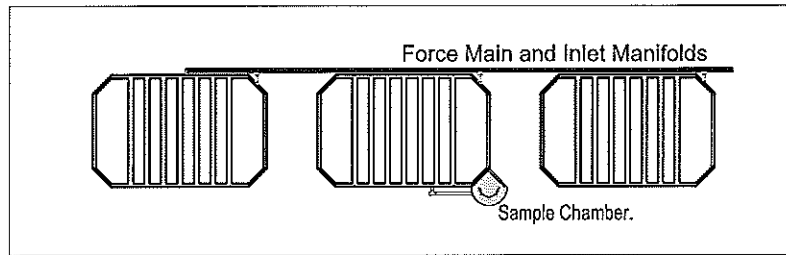
Due to the high quality of the peat biofilter effluent, the siting and sizing requirements for final effluent disposal are typically less stringent than for conventional systems or systems that do not provide the same degree of treatment.

The Puraflo is a modular system with each module rated for 150 gpd maximum. The range and rated capacity of the system is therefore a multiple of the standard unit based on up to 150 gpd maximum per module.



TYPICAL PURAFLO INSTALLATION.

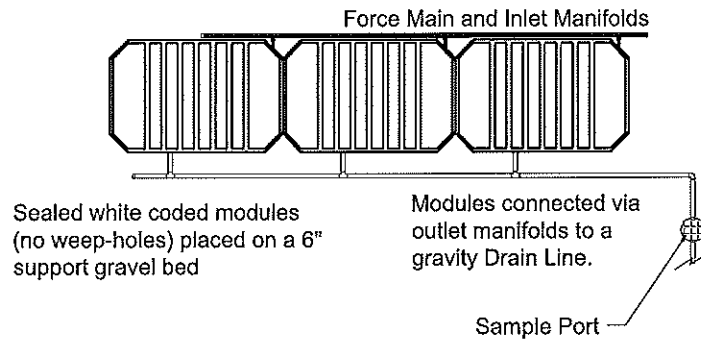
TYPE A - PAD INSTALLATION.



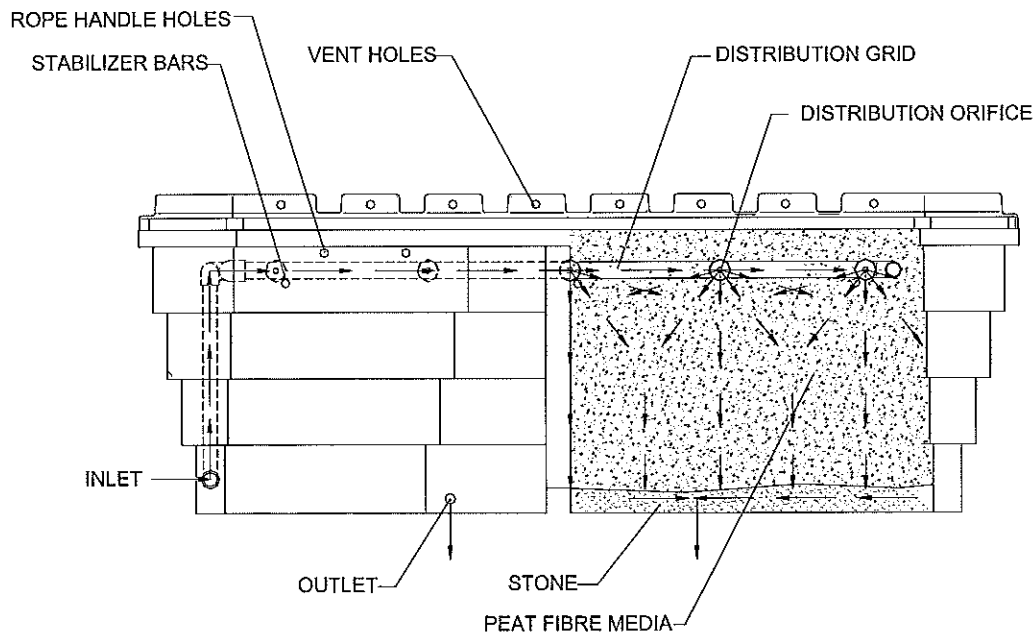
Blue coded modules with weep holes and one green coded module with sampling chamber, drain into a stone Pad for final treated effluent disposal.

Pad dimensions can be selected to match site conditions and modules can be installed side by side as well as end to end (as shown above)

TYPE B - PIPED OUTLET INSTALLATION.



PURAFLO MODULE



2.0 BASIC OPERATION AND MAINTENANCE REQUIREMENTS

The following activities are to be undertaken during each scheduled inspection by the Authorized Service Provider.

1.1 Observe and Monitor

- A wastewater level in the tanks,
- B the septic tank outlet filter
- C watertightness of tanks, risers and pipe connections at tanks,
- D operation of pumps, floats valves, electrical controls and alarms,
- E pumping frequency from impulse counters and elapsed run time meters,
- F the peat modules for any structural damage, accessibility, adequate ventilation, excess odors, insect or other pest infestations,
- G vegetative growth over the drainfield,
- H the drainfield area for surfacing of the effluent,
- I a sample of peat biofilter effluent collected from the sampling point to check for effluent clarity and odor (note: peat biofilter effluent may have a brackish to straw color from the humic and fulvic acids naturally present in the peat media)

1.2 Measure and Report

- A Sludge and scum levels in the septic tank,
- B Sludge level and grease presence in the pump tank,
- C pump delivery rate (drawdown test), and
- D dosing volume and measure or calculate average pump run time

1.3 Notification regarding Maintenance &/or Repair Requirements

The service provider shall alert the system owner in a timely fashion of needed maintenance or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, pipe or control system repairs, media replacement, and adjustments to any other component.

3.0 MAINTENANCE CHECKLIST

System Component	Description	O&M Frequency
		Minimum Annually
Septic Tank	Confirm Manhole Lids are secure.	X
	Confirm effluent filter is in place.	X
	Clean effluent filter.	X
	Confirm satisfactory condition of risers.	X
	Confirm satisfactory condition of pipe.	X
	Record wastewater level in tank.	X
	Record sludge level in tank.	X
	Record scum level in tank.	X
	Confirm water-tightness of tank connections.	X
	De-sludge Septic Tank (if required).	X
Pump Tank	Confirm Manhole Lids are secure.	X
	Record wastewater level in tank.	X
	Confirm water-tightness of tank.	X
	Confirm satisfactory condition of risers.	X
	Confirm satisfactory condition of pipe connections.	X
Pump	Confirm pump is accessible and removable.	X
	Confirm pump is operating satisfactorily.	X
	Confirm floats are operating satisfactorily.	X
	Confirm pump valves are operating satisfactorily.	X
	Record the condition of floats, control panel & alarms	X
	Record pump readings.	X
	Record Elapsed Time meter Readings.	X
	Examine and Record Timer Settings.	X
Control Panel	Record the condition of control panel & alarm.	X
	Record pump readings.	X
	Record Elapsed Time meter Readings.	X
	Examine and Record Timer Settings.	X
	Confirm alarm is working.	X
Sample chambers	Confirm satisfactory condition of sample chamber.	X
	Extract effluent sample.	X
	Conduct odor and visual inspection of sample.	X

System Component	Description	O&M Frequency
		Minimum Annually
Piping	Confirm satisfactory condition of force main.	X
	Confirm satisfactory condition of manifold.	X
	Confirm satisfactory condition of orifice plates/connections.	X
*Peat Media	Record the condition of the peat.	X
	Examine peat for insect or pest infiltration.	X
	Check for evidence of continuous ponding on media surface.	X
	Confirm distribution grid is level.	X
	Confirm even distribution of wastewater within modules.	X
	Confirm that the ventilation holes around the top of the module are free from obstruction.	X
Drainfield	Check for evidence of surface water diversion.	X
	Check for evidence of ponding/surfacing of effluent.	X
	Check for excessive vegetative growth over drainfield.	X
	Confirm stability of percolation area.	X

*Under normal operating conditions it is not necessary to remove the lids of the Puraflo® module however, it is recommended that a visual inspection is undertaken annually.

4.0 PERIODIC REMOVAL OF SOLIDS

The Puraflo® Peat Biofilter is a passive biological treatment system and as such only the septic tank, & occasionally the pump tank, require periodic desludging.

The septic tank should be inspected annually and desludged in accordance with State and EPA guidelines. Depending on use, a typical home will produce sufficient sludge requiring the tank to be desludged during a two to three year period. The importance of desludging can not be over-emphasized since the Puraflo® system is designed to treat effluent from a well functioning septic tank where a significant portion of insoluble solids have been allowed to settle out. The effluent filter installed with the Puraflo® system should be cleaned annually or at the time of system inspection. The inspection / desludging should be carried out by a certified septic tank pumper.

5.0 PURAFLO® EFFLUENT – SAMPLING AND ANALYSIS

5.1 Treated Waste Water Quality

When treating domestic strength wastewater up to the design flows and loads a properly maintained Puraflo® system will exceed the performance requirements of NSF Standard 40 Class 1. Actual NSF test results established through analytical methods described in ANSI / NSF 40 averaged 2mg/l CBOD and 2 mg/l TSS.

PARAMETER	NSF 40 Standard 30-d average	Puraflo Average Concentration
CBOD (mg/l)	25	2
TSS (mg/l)	30	2
pH (pH units) range	6 - 9	6 - 7.5

Additional NSF testing results are reproduced in the following table.

PARAMETER	Puraflo Performance
Total Nitrogen	>70% reduction
NH ₃ -N (mg/l)	<1
Fecal Coliform elimination	99.9% removal

5.2 General Requirements for Sampling

Where required by local regulation the following describes the correct methods for collecting and transporting an effluent sample to an accredited laboratory.

- The person responsible for sampling (here after referred to as the sampler) should preferably have a technical background, and where possible, be familiar with the workings of the Puraflo® system.
- Personal safety should be the first consideration of the sampler. The sampler should wear protective clothing, eye protection and sterile disposable gloves at all times. The gloves should be discarded immediately after sampling i.e. one pair of gloves per sampling event. This safeguards against cross contamination of samples. Always wash hands after sampling.
- All samples shall be obtained, preserved and analyzed in accordance with the guidelines outlined in EPA's document 40 CFR 136.
- All samples for inorganic analysis (i.e. BOD, TSS) should be collected into polyethylene sampling containers (or equivalent). All samples for microbiological analysis should be collected into sterile plastic containers (or equivalent). Different laboratories provide different sampling containers.
- The volume of sample required for proper analysis varies according to the test performed. Confer with the local laboratory to establish the volume requirements needed based on the total number of parameters requiring analysis.
- All sampling containers should be clearly labeled to include, as a minimum, the following information: -
 1. A unique sample identification number
 2. The source/location of sample collection
 3. The date and time the sample was collected
 4. The name of the sampler responsible
 5. The name of the treatment system owner
 6. All parameters requiring analysis

- All samples must be properly stored during transportation to the laboratory. This usually involves cooling the sample and storing it in the dark (away from sunlight) to inhibit further biochemical reactions.
- All time sensitive samples must be delivered to the laboratory within 6 hours of sampling. Therefore, travel time, laboratory operating hours, weekend or holiday schedules all need to be considered with any sampling program.
- The laboratory responsible for analysis should be certified or accredited and have a chain of custody and quality control system in place.

5.3 Puraflo® Sampling Protocol

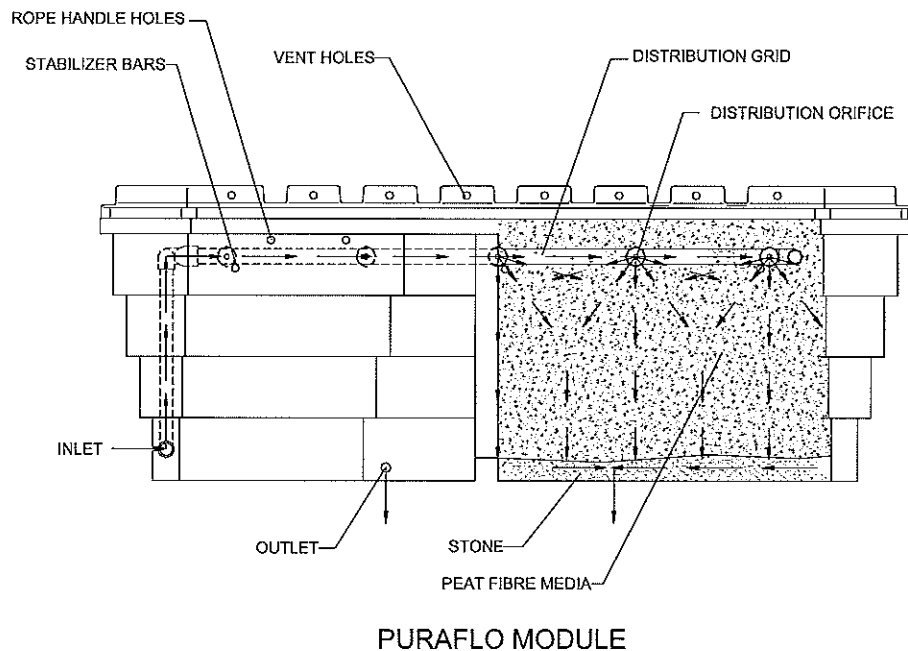
1. Put on protective clothing, eye protection and gloves where required.
2. Locate and remove the lid of the sampling chamber, exposing the effluent discharge pipe below. Typically, there should be a slow steady drip of effluent from the discharge pipe. Do not force flow through the system by running the pump on manually operation.
3. Clean the discharge pipe to remove any residual solids or a 'slimy growth'.
4. Once the effluent is free flowing, carefully place the mouth of the sample bottle directly under the falling stream of effluent. Be careful not to touch the discharge pipe with the mouth of the sample bottle. If the sampling bottle is too tall to fit under the discharge pipe, a 'dipping device' may be required. Please ensure that the dipping device is thoroughly cleaned and sterilized before sampling
5. Refill the container almost to the top, leaving approx. 1-5% of the container volume to allow for thermal expansion during transportation. It may take 10 to 20 minutes to acquire the needed volume prescribed by the accredited lab.
6. If a microbiological sample is required, a sterile plastic container (or equivalent) should be used. Carefully remove the lid of the sampling container using the thumb and forefingers. Fill the bottle to the top, and replace the lid immediately. Do not rinse the bacteriological sampling container, fill it only once, being careful not to allow your hands to come into contact with the rim of the container. Extreme care must be taken because even a properly collected sample can become contaminated.
7. Label all sampling containers with the following information:-
 - A unique sample identification number
 - The source/location of sample collection
 - The date and time the sample was collected
 - The name of the sampler responsible
 - The name of the treatment system owner
 - All parameters requiring analysis
8. Note any unusual occurrences during sampling.
9. Remove the protective gloves and dispose of carefully.
10. Store all samples in ice-packs (or equivalent) for transportation to the lab.
11. Store all samples in the dark.
12. All time sensitive samples should be delivered to the laboratory within 6 hours of sampling. All samples should be analyzed on the same day as sampling.

5.4 Visual and Odor Inspection

The Puraflo system should produce an effluent that is virtually clear of suspended solids, however, the effluent may sometimes have a slight brown-yellow color due to varying concentrations of naturally occurring organic compounds (humic & fulvic acids; tanins) which are occasionally leached out of the peat.

The system should produce an effluent with virtually no odor, although a slight earthy smell may be detectable on occasions.

If the system is producing an effluent which gives off an offensive odor or that which contains a high concentration of suspended solids, then the system may be experiencing difficulties and troubleshooting should be carried out.



6.0 REPLACING SYSTEM COMPONENTS

6.1 Replacing the Pump

Equipment required: - Screwdriver/Wire Ties/Pliers/Gloves/Replacement pump

1. Isolate Main Power
2. Unwire Pump
3. Remove pump tank manhole cover
4. Disconnect force main piping
5. Extract pump (pull-rope/pull-chain)
6. Remove wire from conduit
7. Remove force main piping from pump
8. Discard of spent pump in accordance with proper regulatory handling and disposal rules
9. Connect force main piping to replacement pump
10. Install wiring in conduit
11. Lower pump back into original position
12. Reconnect force main piping
13. Reconnect power the system
14. Go to control panel
15. Switch from automatic to manual to activate the pump
16. Carry out drawdown test
17. Make timer adjustments as required.
18. Return control panel to automatic setting
19. Close control panel and secure
20. Secure manhole cover back in place

6.2 Replacing the Float(s)

Equipment Required: - Screwdriver/Wire Ties/Pliers/Gloves/Replacement Float

1. Isolate Main Power
2. Unwire float connection to control panel
3. Remove pump tank manhole cover
4. Remove defective float and replace
5. Secure manhole cover back in place
6. Reconnect float connection to control panel
7. Reconnect main power

6.3 Replacing the Control Panel/Alarm

Equipment Required: - Screwdriver/Wire Ties/Pliers/Gloves/Replacement Panel

1. Isolate Main Power
2. Unwire inlet power from control panel
3. Unwire pump connections from control panel
4. Unwire float(s) from control panel
5. Disconnect inlet conduit
6. Unscrew control panel from mounting bracket
7. Discard of spent control panel pump in accordance with proper regulatory handling and disposal rules
8. Mount new control panel
9. Reconnect inlet conduit
10. Rewire float(s) connections
11. Rewire pump connections
12. Rewire inlet power
13. Reconnect main power
14. Switch control panel from automatic to manual to activate pump
15. Remove the manhole cover from the pump tank
16. Raise alarm float in pump tank to test alarm
17. Secure manhole cover back in place

6.4 Replacing the Peat Fibre Media

Peat fibre replacement should only be carried out under the direct supervision or control of the manufacturer. Note that not all peat is the same and only peat fibre provided by Bord na Mona should be used. Replacing media without correcting potential problems may lead to a shorter lifespan.

Needed:

1. Apply for repair permit (if required).
2. Contact your local authorized distributor to oversee the project.
3. Contact local authorized distributor to order the replacement peat fibre.
4. Backhoe, skid loader, or other equipment to lift approximately 1500 lbs. of peat fibre.
5. Pump truck to pump partly-dry material (and #5 rock) or equipment to remove peat from site by hand.
6. Two workers w/ pitchforks & shovels.
7. Approved land application area, landfill, or sewage treatment plant w/ drying bed for disposal.
8. ½" wrench.
9. Water source with hose to reach module area.
10. Minimum 150 lbs. of clean septic stone or #5 gravel to fill bottom of each module.
11. Replacement peat fibre media from Bord na Mona.

Process:

1. Remove lids.
2. Remove distribution grid.
3. If using a pump truck, add water as needed (plug effluent line for type B systems).
4. Pump or shovel out all peat media.
5. Ensure that drain holes are open & flowing (the piped outlet system will have two open holes on one side & two plugged holes on the other).
6. Run pump to ensure that the inlet piping is free flowing.
7. Place a minimum of 150 lbs. #5 gravel over outlet holes & in module drain channels.
8. Place first layer of peat fibre media in modules up to 2nd step in plastic module & compact.
9. Place and compact second layer of peat fibre media to grid level.
10. Replace grid, ensuring that it is strapped to cross bars with stainless steel straps. Ensure the grid is level. Activate pump to confirm equal distribution within the module and between the modules
11. Place final layer of peat fibre media to top of module and level out. DO NOT compact / step on grid
12. Replace lids and secure with the four bolts provided.
13. Perform draw down test & verify that the control panel is set properly.

Note – Ensure that the peat fibre removed from the modules is disposed of in accordance with local & state regulations.

7.0 TROUBLESHOOTING CHECKLIST

DETECTION	POSSIBLE CAUSE	ACTION
Experience slow flush but electrics are in good working order	<ol style="list-style-type: none"> 1. Unacceptable level of solids in septic tank 2. Effluent filter blocked 	<ol style="list-style-type: none"> 1. Pump out septic tank and clean effluent filter 2. Clean effluent filter
Alarm sounds continuously and effluent level rises steadily in the pump tank - this can eventually lead to slow flush caused by sewage backing up and could eventually cause effluent to pond at the septic or pump tank	<ol style="list-style-type: none"> 1. Pump failure due to circuit breaker switch being tripped to the off position by an electrical storm or power surge 2. Pump fails due to faulty system electrics or pump itself is faulty 	<ol style="list-style-type: none"> 1. Conserve water usage, reset circuit breaker and test the alarm - if the problem recurs call your Authorized Service Provider 2. Conserve water usage and call your Authorized Service Provider
<p>Alarm sounds periodically but resets itself (indicating that the pump is still operating)</p> <p>Some states require alarms that are latched (continue to alarm after the alarm event has been corrected) and will not auto-reset themselves in which case it will be necessary to reset the alarm manually</p>	<ol style="list-style-type: none"> 1. High water usage above design capacity activates the alarm float switch 2. Leaking plumbing fixtures 3. Leaking pump or septic tank 4. Broken timer or incorrect timer settings. 5. Latched alarm 	<ol style="list-style-type: none"> 1. Reduce water usage to range within the design capacity - 2. Repair leaking plumbing fixtures 3. Repair leaks in septic or pump tank 4. Conserve water usage and call your Authorized Service Provider. 5. Reset manually
No alarm warning - effluent level rises continuously in the pump tank potentially leading to slow flush and/or effluent ponding around septic or pump tank	<ol style="list-style-type: none"> 1. Pump and alarm failure due to circuit breaker switches being tripped to the off position by an electrical storm, power surge or power failure 2. Pump and alarm fail concurrently due to faulty system electrics 	<ol style="list-style-type: none"> 1. Reset circuit breaker and test the alarm - if the problem recurs call for maintenance 2. Conserve water usage and call your Authorized Service Provider
Ponding of effluent on peat fibre media	<ol style="list-style-type: none"> 1. Failed drainfield 2. Media at end of useful life 	<ol style="list-style-type: none"> 1. Consult with your Authorized Service Provider 2. Replace peat fibre media